Patent claims

1. A method for influencing combustion processes of fuels, in which electric means are used for guiding and/or changing a flame, the flame being subjected to the action of an electric field and charge carrier transport from the flame to at least one of the field-producing electrodes or vice versa being limited by the fact that the flame and the electrode are separated from each other, characterized in that, in order to separate flame and electrode, an ion-conducting material is used, charge carrier transport from the flame to at least one of the field-producing electrodes or vice versa being limited.

2. The method as claimed in claim 1, material and geometry of the ion-conducting material being chosen such that a temperature-dependent transition from the insulating to the conductive state takes place as a result of ion conduction, the conductivity remaining limited to permissible values in the conductive state.

3. The method as claimed in claim 2, the conductivity being limited in such a way that the charge carrier transport is low and the current through the flame does not exceed permissible values.

4. The method as claimed in claim 3, the charge carrier transport being kept so low that, during the combustion process, the occurrence of independent, in particular high-current, discharges, for example of an arc, is prevented.

5. The method as claimed in one of the preceding claims, the charge carrier transport being limited in such a way that thermo-acoustic emissions are reduced.

6. The method as claimed in one of the preceding claims, characterized in that the fuel used is a pre-mixed gas.

7. A device for carrying out the method as claimed in claim 1 or one of claims 2 to 6, by using stabilizing and/or pollutant-reducing means for influencing the flame during the combustion process, the means having field-producing electrodes and at least one of the electrodes being separated from the flame by an insulating material enclosure, characterized in that the insulating material enclosure (3) consists of an ion-conducting material, which prevents charge carriers from the flame (2) striking the electrode (7, 9).

8. The device has claimed in claim 7, characterized in that the material changes to the conductive state as a result of the ion conduction at temperatures of a few 100 K.

9. The device as claimed in claim 7 and 8, characterized in that the ion-conducting material is aluminum oxide.

10. The device as claimed in claim 7 and 8, characterized in that the ion-conducting material is a zirconium oxide stabilized with additives.

11. The device as claimed in claim 10, characterized in that the additives are yttrium oxide.

12. The device as claimed in claim 7, characterized in that the insulating material enclosure (3) surrounds the flame (2) in such a way that the fuel enters at its one end and the combustion waste gas emerges at the other end.

13. The device as claimed in claim 7, characterized in that there is at least one further electrode (1, 9), which is not surrounded by an insulating material enclosure (3).

14. The device as claimed in claim 7, characterized in that the further electrode (9) is located inside the insulating material enclosure (3).

15. The device as claimed in claim 14, characterized in that the electrode arranged inside the insulating material enclosure (3) is formed by a housing or another electrically conductive part of the burner (1).

16. The device as claimed in one of claims 7 to 15, characterized in that the electrodes (7, 9) are at a potential different from that of the first electrode (1).

17. The device as claimed in one of claims 7 to 16, characterized in that at least one of the electrodes (7) rests in a positive manner from the insulating material enclosure (3).

18. The device as claimed in claim 7, characterized in that the electrodes (7, 9) of different potential are separated electrically from the insulating material enclosure (3).

19. The device as claimed in claim 7, characterized in that the insulating material enclosure (3) has electrically insulating leadthroughs (10).

20. The device as claimed in one of claims 7 to 18, characterized in that the electrodes (7, 9) form toroidal annular electrodes.

21. The device as claimed in one of claims 7 to 20, characterized in that the electrodes (7, 9) form cylindrical electrodes.

22. The device has claimed in one of claims 7 to 21, characterized in that the electrodes (7, 9) are formed by films applied to the outside of the insulating material enclosure and/or by

layers produced by vapor deposition or spraying on.

23. The device as claimed in one of claims 7 to 22, characterized in that the electrodes (1, 7; 1, 9; 6, 7) are connected by feed lines to a power supply unit (8).

24. The device as claimed in claim 23, characterized in that the power supply unit (8) supplies a direct voltage.

25. The device as claimed in claim 23, characterized in that the power supply unit (8) supplies a clocked direct voltage, an alternating voltage or a pulsed voltage.

26. The device as claimed in claim 23, characterized in that the power supply unit (8) supplies a clocked direct voltage, an alternating voltage or a pulsed voltage which are superimposed on a constant direct voltage.

27. The device as claimed in one of claims 7 to 26, characterized in that there are sensors for the frequency and/or amplitude of combustion oscillations and/or the pollutant concentration in the waste gas stream, the frequency, amplitude and phase of the voltage applied to the electrode being controlled or regulated by at least one control and/or regulating device such that the combustion oscillations and the pollutant concentration are minimized.